



UNITED STATES PATENT AND TRADEMARK OFFICE

T

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/561,613	12/20/2005	Wolfram Stuer	12810-00182-US1	6482
23416	7590	06/11/2007	EXAMINER	
CONNOLLY BOVE LODGE & HUTZ, LLP			CHO, JENNIFER Y	
P O BOX 2207			ART UNIT	PAPER NUMBER
WILMINGTON, DE 19899			1621	
MAIL DATE		DELIVERY MODE		
06/11/2007		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)
	10/561,613	STUER ET AL.
	Examiner	Art Unit
	Jennifer Y. Cho	1621

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 20 December 2005.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-17 is/are pending in the application.
 - 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-17 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 12/20/05.
- 4) Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) Notice of Informal Patent Application
- 6) Other: _____.

Detailed Action

Acknowledgment is made of the Information Disclosure Statement filed 12/20/2005.

Claim Objections

Claim 4 is objected to because of the following informalities: For "R", the word "aralkyl" is misspelled. The Examiner suggests the correct spelling is "arylalkyl". Appropriate correction is suggested.

Claim Rejections - 35 USC 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.

3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gosser (U.S. 3,853,754), in view Brookhart (E.P. 0,475,386), further in view of Goldup et al. (U.S. 3,645,891).

The instant claims are drawn to a method of separating a reaction mixture of an unsaturated or saturated compound, selected from adipic diester, adiponitrile, 5-cyanovaleric ester, 1,4-butenedinitrile, 5-cyanopentenoic ester and hexenedioic diester, from a transition metal catalyst, using a semi permeable membrane, which selectively retains the metal catalyst. The unsaturated or saturated compound is obtained by adding two terminal olefins, which have additional functional groups, to the transition metal catalyst, and alternatively hydrogenating the unsaturated compound to form the corresponding saturated compound.

Gosser teaches a method of separating a reaction mixture of unsaturated or saturated nitrile compounds, e.g. adiponitrile, from a transition metal catalyst, e.g. a ruthenium or rhodium compound, from the coupling of a terminal olefin, e.g. acrylonitrile, with itself, in the presence of hydrogen to hydrogenate the coupled product (column 15, example 18, lines 50-68; column 2, 15-43; column 11, lines 20-28). The final reaction mixture was subjected to separation using a polyimide organic membrane at a pressure of 450 psi (3.1 Mpa) on the retentate side, in which the ruthenium transition metal catalyst was substantially absent in the permeate (column 15, example 18, lines 50-68; column 11, lines 50-51). Thus the weight ratio of the reaction mixture of adiponitrile to

the transition metal is smaller than in the retentate. The temperature range for the separation can be conducted over a broad range and includes temperatures of 110°C and higher (column 10, lines 50-55).

Gosser is deficient in the sense that it does not teach Applicant's particular rhodium metal catalyst and the membrane does not comprise substantially inorganic materials.

Brookhart teaches a method of forming functionalized olefins by reacting terminal olefins in the presence of a rhodium compound (page 2, lines 22-24 and abstract), of the formula $[L^1RhL^2L^3R]X^-$ where L^1 is an anionic pentahapto ligand (e.g. pentamethylcyclopentadienyl (page 4, line 43)); L^2 is an uncharged 2-electron donor; L^3 is an uncharged 2-electron donor; R is selected from the group consisting of H, C_1-C_{10} -alkyl, C_6-C_{10} -aryl and C_7-C_{10} -arylakyl ligands; X^- is an uncoordinating anion (e.g. BF_4^- (page 4, line 4; page 5, lines 10-11)); and where two or three of L^2 , L^3 and R are optionally joined (page 2, lines 20-37). Additionally, L^2 and L^3 can be ethylene, methyl acrylate or acrylonitrile (page 4, lines 47-48, 55-56); when L^2 and R are together it is $-CH_2-CH_2CO_2Me$ (page 5, lines 5-7; page 6, line 44, example 2); when L^2 , L^3 and R are together it is $MeO_2C(CH_2)_2-(CH_2)-(CH_2)CO_2-Me$ (page 4, line 36-37). Brookhart teaches several rhodium complexes, including $[Cp^*Rh(C_2H_4)_2H]^*BF_4^-$ (page 11, lines 30-42).

Brookhart is deficient in the sense that it does not teach a process for the separation of the transition metal complex from the organic mixture, using a semi-permeable membrane.

Goldup et al. teaches a process for the separation of a transition metal complex from an organic compound, in a homogeneous mixture, using an inorganic silicone rubber membrane and an applied pressure differential (column 1, lines 53-67).

With regard to Applicant's limitations that the separation limit has a mean average of 500 to 100000 daltons, the pressure ratio is from 2 to 100, and the permeate pressure is from 1 to 1000 kPa, since the prior art is silent as to these limitations, it is the position of the examiner that one of ordinary skill in the art, at the time of the invention, would through routine and normal experimentation determine the optimization of these limitations to provide the best effective variable depending on the results desired. Thus it would be obvious in the optimization process to optimize the separation limit, the pressure ratio and the permeate pressure. The Applicant does not show any unusual and/or unexpected results for the limitation stated. Note that the prior art provides the same effect desired by Applicant, the effective separation of the transition metal catalyst from the product. Furthermore, Applicant's permeate pressure range, includes a pressure of atmospheric pressure, which is the assumed pressure when no explicit number is stated. With the assumption that atmospheric pressure is the pressure utilized, the prior art's permeate pressure and the pressure ratio would fall within Applicant's limitations.

Therefore, it would be *prima facie* obvious to one of ordinary skill in the art at the time of the invention, to substitute Brookhart's rhodium compound and Goldup et al.'s inorganic membrane for Gosser's transition metal compound and organic membrane, to separate a reaction mixture of a unsaturated or saturated nitrile compound from a

transition metal compound, since it is well-known that a variety of purification methods can be used in the synthesis of functionalized olefins, using transition metal compounds. The expected result would be an efficient separation of the transition metal compound from the organic compounds in a homogenous mixture, using a semi-permeable membrane.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer Y. Cho whose telephone number is (571) 272 6246. The examiner can normally be reached on 9 AM - 6 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Johann Richter can be reached on (571) 272 0646. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Jennifer Cho
Patent Examiner
Art Unit: 1621



Johann Richter
Supervisory Patent Examiner
Technology Center 1600